Australian Bureau of Statistics

6202.0 - Labour Force, Australia, Apr 2012 Quality Declaration
ARCHIVED ISSUE Released at 11:30 AM (CANBERRA TIME) 10/05/2012

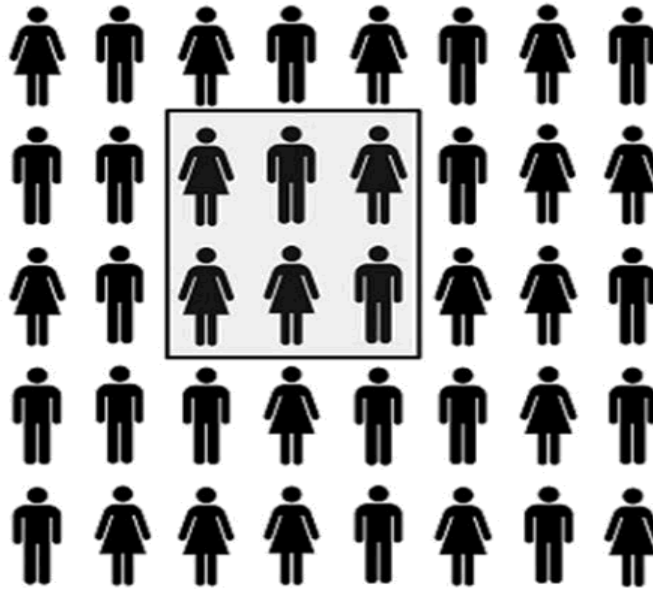## POPULATION BENCHMARKS AND LABOUR FORCE SURVEY

INTRODUCTION

Each month a selection of around 30 thousand dwellings from across Australia participate in the Labour Force Survey. This equates to a sample of between 50 and 60 thousand individuals aged 15 and over or 0.3% of the population. Because the Labour Force Survey uses a sample to calculate estimates and not a count of every individual aged 15 and over, it is important that the sample that is selected is representative. If any particular demographic is over- or under-represented in the fully responding sample of households, it is also important that it is accounted for in the estimation process. Here we will discuss how population benchmarks are used to correct for unrepresentative samples in the Labour Force Survey, describe how the benchmarks for the Labour Force Survey are calculated and explore some of the features and limitations of the benchmarks.

WEIGHTING USING POPULATION BENCHMARKS - A SIMPLIFIED EXPLANATION

As mentioned previously, the estimates from the Labour Force Survey are based on a sample of the Australian population aged 15 and over. Population benchmarks are used to assign 'weights' to individual records to overcome any misrepresentation that might exist in the sample. The term misrepresentation in this context refers to either an over- or under-representation of a specific demographic group in the sample (i.e. age, sex or specific geographic location).

Here we will provide an explanation of how weighting works using a very small and simple population. Below we have a population of 40 people comprising equal numbers of men and women (20 each). From this population we have selected a sample of 6 people, which is made up of 2 men and 4 women. Straight away we can tell our sample has an over-representation of women and an under-representation of men. We can assign each individual in our sample a weight to account for the over- and under-representation. For example, the two men in sample represent a total of 20 men, therefore, each man in sample will have a weight of 10 (i.e. 20/2), whereas the weight for each of the women in sample is five (i.e. 20/4).

HOW ARE LABOUR FORCE POPULATION BENCHMARKS CALCULATED?

Weighting using population benchmarks in the Labour Force Survey is done in a similar way to the example above, except it is much more complex. Each individual record in the sample is assigned a weight that is largely dependent on their sex, age and where they usually live. But before a weight can be assigned we first must have reliable information on the **composition** of the population. Population benchmarks provide this information.

Population benchmarks used in the Labour Force Survey use the most recent Estimated Resident Population (ERP) as a starting point with certain subpopulations excluded (i.e. defence force personnel, out of scope territories and children aged under the age of 15 are excluded). However, at the time population benchmarks are required for the Labour Force Survey, the most recent ERP figures are for a time point in the past. To produce population benchmarks for the Labour Force Survey, ERP growth is projected forward one year, which is one quarter ahead of the current quarter and then interpolated back to the previous Labour Force population benchmark. For the current quarter this means ERP growth was projected forward from the September 2011 ERP figure, to the end of the September 2012 quarter and then interpolated back to the end of the March 2012 quarter (See summary figure below).
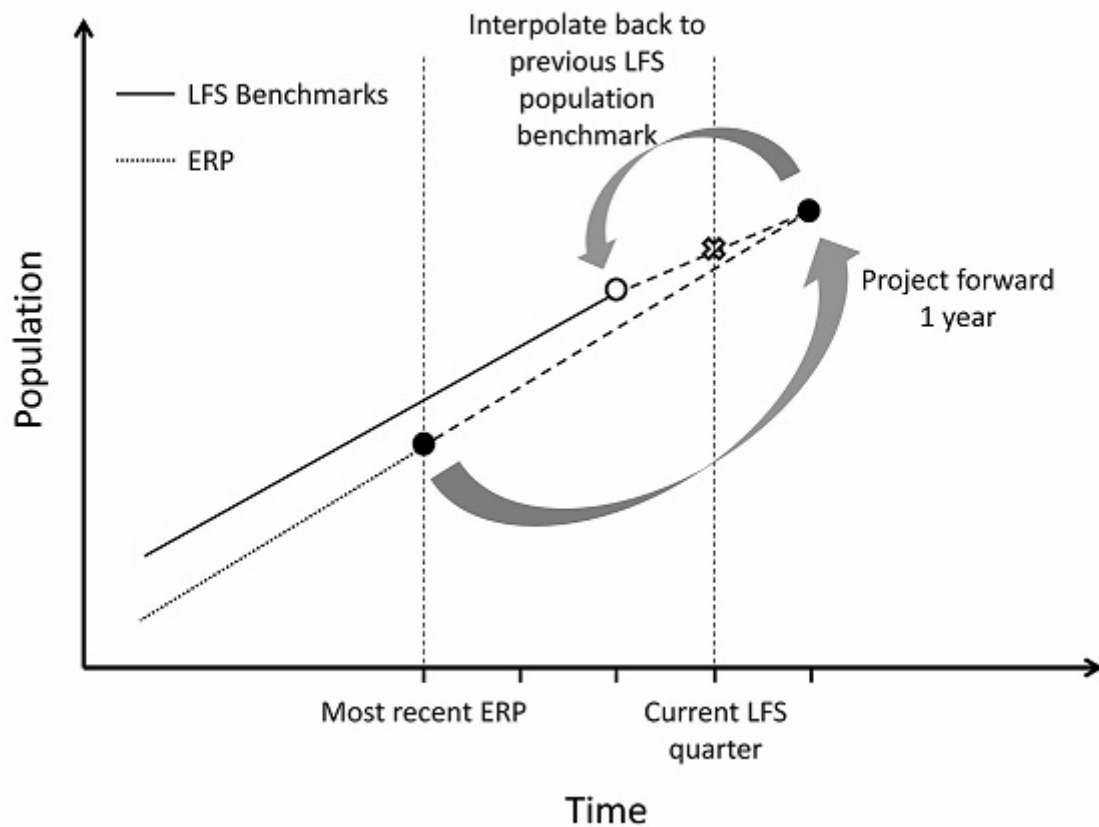
PROJECTION ASSUMPTIONS AND NET OVERSEAS MIGRATION

The projection used to derive population benchmarks for the Labour Force Survey depends on a number of assumptions about the different components of population growth. The components of population growth for both total population and state populations are:

- Births and Deaths
- Net Interstate Migration (NIM)
- Net Overseas Migration (NOM)

For Births and Deaths and NIM it is assumed that these components of growth are unchanged from the same period as the most recent ERP figures. Prior to October 2010, it was also assumed that the NOM component did not change from that used in the most recent ERP. However, due to the volatile nature of NOM in recent times, the ABS has revised the assumptions used to calculate the contribution of NOM to the Labour Force population benchmarks. Before examining the assumptions that are used to inform the NOM component of population projections, it is important to understand what NOM is, how it is calculated for ERP and also to explore some of the difficulties associated with providing an accurate account of NOM for the Labour Force population benchmarks.

WHAT IS NOM AND THE 12/16 MONTH RULE?

Net overseas migration is the net gain or loss of population through immigration to Australia and emigration from Australia. It is based on an international travellers' duration of stay being in or out of Australia for 12 months or more; and the difference between:

- the number of incoming international travellers who stay in Australia for 12 months or more (over the 16 month period since their arrival) who are not currently counted within the population, and are then added to the population (NOM arrivals); and
- the number of outgoing international travellers (Australian residents and long-term visitors to Australia) who leave Australia for 12 months or more (over the 16 month period since their departure), who are currently counted within the population, and are then subtracted from the population (NOM departures).

However, it is important to point out that the period of 12 months does not have to be continuous. This means that someone may enter / leave the country and then leave / return for short periods. The 12 month period is calculated only by the total time they have spent inside or outside the country over a 16 month period and is not in any way based on the continuity of the period within or outside the country.

What this means for estimating ERP each quarter is that we can only be certain about NOM for a period of at least 16 months in the past and not the current quarter. It also means that for each new quarter the ABS has to estimate whether people who arrive or leave in the reference period should be counted or subtracted from the population (known as preliminary NOM). To calculate these preliminary estimates the ABS uses propensity models. In simple terms, the propensity models used by the ABS look at how particular groups of travellers behaved one year ago. This behaviour is then used to calculate how similar groups may behave into the future and thus enables a preliminary estimate to be calculated for NOM. After 16 months have past, the final figure for NOM (known as final NOM) can be calculated based on actual behaviour and this is included in revisions that are published twice a year, in March and September.

NOM AND LABOUR FORCE POPULATION BENCHMARKS

Now that we have a broad understanding of how the NOM component of ERP is calculated, we will explore some of the difficulties associated with calculating the NOM contribution to the Labour Force population benchmarks and explore some of the limitations of these population benchmarks. As was discussed previously, the most recent ERP, from which the Labour Force population benchmarks are derived, relies on propensity models to calculate the NOM component of population growth. This means that there is some degree of uncertainty built into the population estimates used in the Labour Force Survey. This is solely because an individual's NOM 'status' cannot be determined until 16 months after their arrival / departure. This uncertainty is somewhat compounded because to calculate the Labour Force population benchmarks for the current Labour Force quarter the population growth needs to be projected six months ahead of the current Labour Force month or one year ahead of the most recent ERP estimate. In effect, this means that the behaviour of overseas travellers needs to be forecast, many of which are yet to arrive in or depart from Australia. To do this, the ABS uses a range of supplementary data to shape the assumptions for the NOM component of the Labour Force population benchmarks. One of the main sources of supplemental data is forecasts for NOM produced by the Department of Immigration and Citizenship. The details of the forecasting framework used by the Department of Immigration and Citizenship can be found in Appendix C of their quarterly publication: 'The Outlook for Net Overseas Migration'.

The ABS started using this approach from October 2010. Prior to this, the assumptions used to calculate NOM's contribution in the Labour Force population benchmarks were the same as for Births and Deaths and NIM, that is, it was assumed that NOM was the same as at the time ERP was estimated. This new methodology was introduced to more accurately account for more contemporary changes in NOM, as in recent times NOM has been relatively volatile.

REVISIONS TO LABOUR FORCE POPULATION BENCHMARKS AND IMPACTS ON ESTIMATES

Normally the Labour Force population benchmarks are fixed once they are forecast. Benchmarks are revised once every five years, after data from the Census of Population and Housing has been calculated and rebasing of ERP has been finalised. However, the benchmarks were revised in July 2010 after significant revisions were made to NOM in ERP. These revisions included all data from July 2006 to June 2010.

In recent times, there has been renewed interest in how NOM is contributing to the population benchmarks and speculation that the Labour Force population benchmarks are under-estimating population growth. It is important to note that the population benchmarks used for the Labour Force Survey are not intended to be used as a guide for future population growth. The sole purpose of the population benchmarks is to account for under- and over-representation of population groups in the sample used to calculate the monthly Labour Force estimates. The head count in the Labour Force population benchmarks is somewhat irrelevant as all that changes when the benchmarks are revised up or down is that individuals are either given a larger or smaller weight to reflect the change in population size. Instead, an accurate account of the composition of the population is much more important as this will determine what weight will be given to a particular demographic group.

To illustrate the previous point, we can examine what impact the most recent revisions had on the population count, the composition of the population and two measures produced in the Labour Force: Employment level estimates and the Employment to Population ratio. Below is a graph that shows the difference between the revised population count and the population count from the Labour Force population benchmarks. It shows that the population benchmarks used for Labour Force estimation were underestimating the size of total Labour Force population and this peaked in September 2009.

**Revisions To Labour Force Civilian population, July 2010**
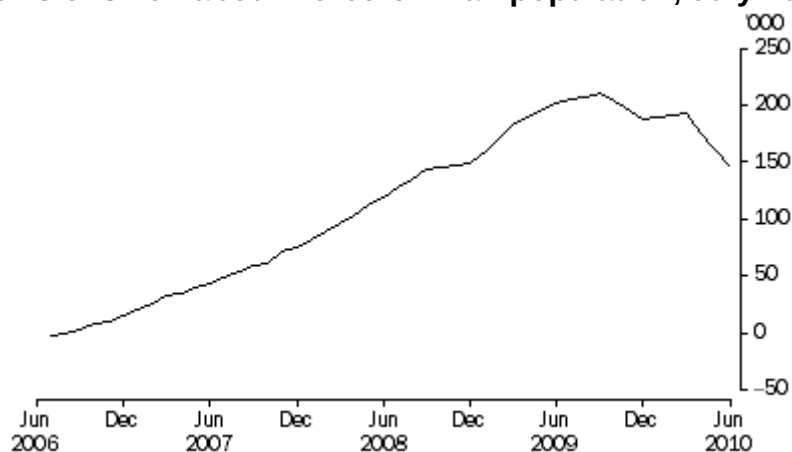
However, if we examine the changes in the composition of the population by analysing the change in age structure we notice that the differences are quite small. The graph below shows the maximum percentage change in age group composition after the revisions in July 2010. The largest change was a 0.31% difference in the percentage of 20 to 24 year olds in the total population. It is important to remember that individuals in the sample are weighted based on age as well as sex and the location of their usual residence.

**Maximum percentage change of age groups after revisions, July 2010**
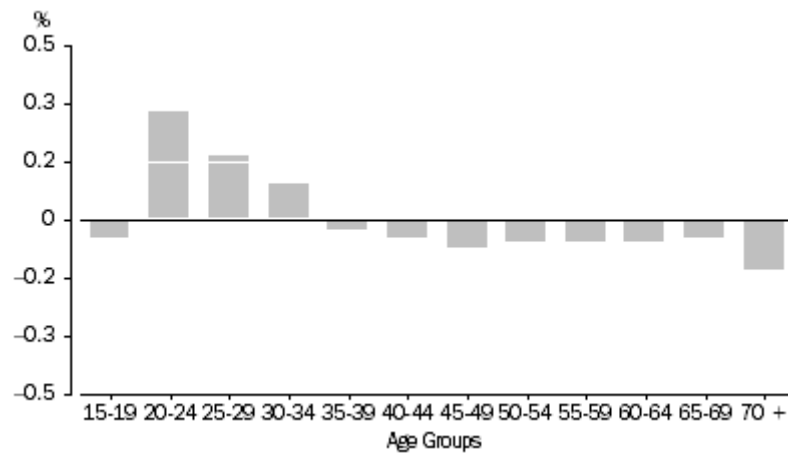
Based on this analysis we can see that while the overall size of the population was revised up in the July 2010 revisions, the actual composition of the population changed only slightly. If we now examine the impact on the employment level estimates we see that, like the Labour force civilian population, the differences appear to be quite large. The graph below shows the largest revision was 156 thousand for September 2009. This does not mean that there were 156 thousand more people employed in September than was first estimated, it means in broad terms the weight assigned to each individual in sample in September was much more after the revisions were carried out.

Revisions to labour force employment level estimates, July 2010
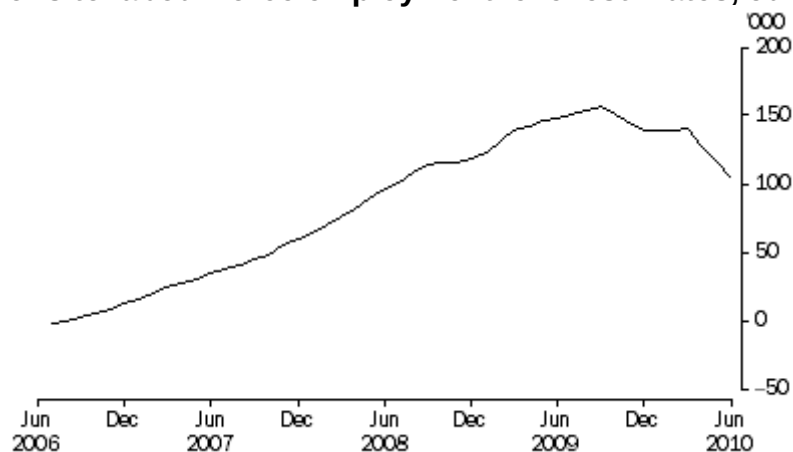
A measure that is less sensitive to revisions is the Employment to Population ratio as population levels are removed as a confounding influence. We can see below that the employment to population ratio is virtually unchanged after the revisions. The largest revision was 0.18% in July 2009. The reason the Employment to Population ratio has not changed markedly is because, 1) the number of employed people in the survey did not change and 2) the composition of the population benchmarks was similar. In essence, the only thing that changed after the revisions was an increase in the total number of people estimated to be part of the population and therefore weights assigned to individuals was increased. The advantages of using the Employment to Population ratio rather than Employment level estimates are further explained in the January 2012 issue of 6202.0 - Labour Force, Australia (Employment level estimates versus Employment to Population Explained).

Revisions to Labour force employment to population ratio, July 2010
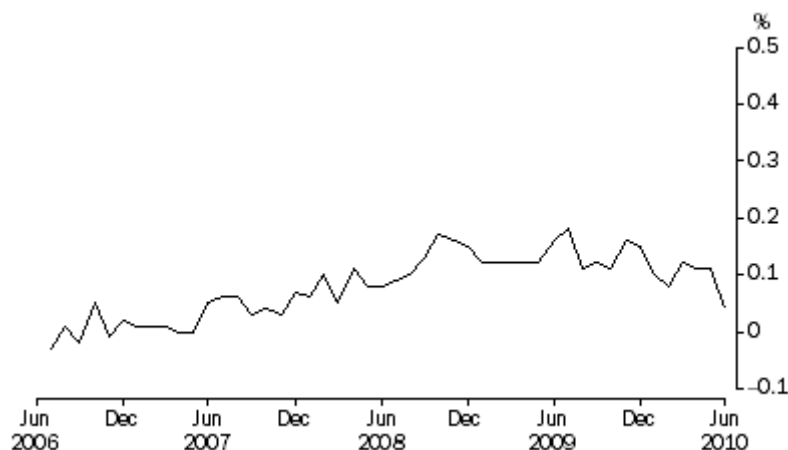
In summary, the Labour Force population benchmarks are **not** designed to give an accurate count of the population. They are designed and used to account for under- and over-representation of population groups in the sample of people that are selected each month. Furthermore, the ABS expects that the new methodology employed to account for NOM in the Labour Force population benchmarks is sufficient to detect any changes in NOM that may impact on our ability to produce quality Labour Force statistics.

This page last updated 11 December 2013